

CLAIMS

1. Dynamic equalizing apparatus comprising,
an input terminal and an output terminal,
an output adder having first and second inputs,
a manually controlled volume controller intercoupling said input terminal and said first input,
level detector having its input coupled to said input terminal and providing a level signal representative of the level on said input terminal,
a level adder having a first input for receiving said level signal and a second input coupled to said manually controlled volume controller receiving a signal representative of the manually controlled volume setting to provide a combined level volume setting signal,
a band pass filter having its input coupled to the output of said manually controlled volume controller characterized by a center frequency at a predetermined bass frequency,
a lookup table having its input coupled to the output of said level setting adder and providing a gain signal representative of a desired gain that is dependent upon the input signal level and the manually set volume controller setting,
and a gain controller coupling the band pass filter to the second input of said output adder and coupled to the lookup table output and responsive to the latter output for establishing said desired gain.
2. Dynamic equalizing apparatus in accordance with claim 1 wherein there is apparatus limiting the detected input level to a minimum value.
3. Dynamic equalizing apparatus in accordance with claim 1 wherein the apparatus includes apparatus limiting the signal delivered to the lookup circuitry to a signal representative of a predetermined maximum value.
4. Dynamic equalizing apparatus in accordance with claim 1 and further comprising an output limiter and a feedback path to the level detector from the limiter constructed and arranged to account for the loss of system gain during limiting.

1 5. Dynamic equalizing apparatus in accordance with claim 1 constructed and arranged
2 to have a first attack time constant associated with said level detector different from a second
3 decay time constant associated with said level detector.

1 6. Dynamic equalizing apparatus in accordance with claim 5 wherein said first time
2 constant is a fast attack time constant and said second time constant is a slow decay time
3 constant.

1 7. A method of dynamic equalizing comprising,
2 sensing the level of an input audio signal to provide a sensed input level signal,
3 sensing the setting of a manually operated volume control,
4 the sensing of said input audio signal level occurring before the input signal is
5 delivered to said manually operated volume control,
6 processing the audio signal after having its volume adjusted by said manually set
7 volume control with an adjustable frequency response adjusted in response to both the sensed
8 input level signal and the manually operated volume control setting,
9 limiting the dynamic range of the sensed input level signal,
10 and feeding back a signal that helps the sensed input level signal avoid sudden
11 changes.

1 8. A method of dynamic equalizing in accordance with claim 7 and further comprising,
2 adding said input level signal and said manually controlled volume control setting
3 signal to provide a combined level volume setting signal,
4 applying the output of the manually controlled volume controller to a filter of bass
5 spectral components,
6 processing the combined level volume setting signal to provide a signal representative
7 of a desired gain that is dependent upon the input signal level and the manually set volume
8 control setting,
9 applying the output of the filter to a gain controller having its gain set to said desired
10 gain,
11 and adding the output of said gain controller to the manually controlled volume
12 controller output signal to provide a dynamically equalized output signal.

9. A method of dynamic equalizing in accordance with claim 8 wherein processing the combined level volume signal includes applying the latter signal to a lookup table to provide said signal representative of a desired gain.

10. A method in accordance with claim 7 and allowing the sensed input level signal to increase in accordance with a first attack time constant and decrease in accordance with a second decay time constant different from said first time constant.

11. Dynamic equalizing apparatus comprising,
 an input terminal and an output terminal,
 a manually controlled volume controller between said input terminal and said output terminal,
 a level detector having its input coupled to said input terminal and providing a level signal representative of the level on said input terminal,
 a limiter coupled to said level detector constructed and arranged to limit the dynamic range of said level signal,
 a feedback path from the limiter to the level detector,
 a filter of bass spectral components coupled between said manually controlled volume controller and said output terminal,
 a signal processor coupled between the level detector and the filter constructed and arranged to provide a gain signal representative of a desired gain between said filter and said output terminal that is dependent upon the input signal level and the manually set volume controller setting,
 and a gain controller between the filter and said output constructed and arranged to establish said desired gain in response to said gain signal.

12. Dynamic equalizing apparatus in accordance with claim 1 wherein the limited dynamic range of said level signal is substantially 20db.